

Classification of Living Organisms

Classification:

The arrangement of organisms into groups and subgroups on the basis of similar characters is called classification.

Basis of Classification:

The classification of organisms is based on such features or characters, which are similar in one kind of organisms and different in different kind of organisms. These characters may be about internal morphology, (anatomy), external morphology, physiology, cell structure, especially the number of chromosomes and chemical composition (especially of proteins) and embryology of the organisms. These characters help in study of intra specific (within the same species) and intra specific (between different) species differences.

The presence of similar characters in different organisms indicates their common ancestry. This similarity because of common ancestral origin is called Homology e.g. arm of a monkey, flipper of a whale and wing of a bat show homology. They are dissimilar apparently but their internal structure (arrangement of bones and muscles) is same. These organs are called homologous organs. Due to this homology, we can, say that monkey, whale and bad had common ancestors and are placed in same large group "vertebrate". This homology is proved to be very helpful in classification.

Aims/Objectives of Classification:

These are given below:

1. To determine similarities and differences between different organisms.
2. To arrange organisms on the basis of similarities and differences.
3. To identify the organisms on the basis of their structure and other prominent characters and study them systematically and logically.
4. To find out inter-relationships of organisms.

First of all, Aristotle classified the organisms on the basis of their resemblances. After this, Theophrastus classified the plants. Then, after a long time, Carolous Linnaeus (1707-1778), suggested a new system of classification. In this way, he started modern taxonomy.

Units of Classification:

The basic unit of classification is species (Plural species). A species is a group of organisms that can breed with one another in nature and produce fertile offspring. All members of a species have same number of chromosomes and also have many other features in common. All the mustard plants belong to one species. All the human beings belong to another species. The members of one species differ from members of other species and do not breed naturally with each other. Such different species, which are closely related, they are grouped in large group called genus (plural; genera) e.g. *Brassica* is a genus. It includes several species like mustard, cabbage and turnip. Similarly, *Felis* is a genus. It includes several species like lion, tiger and cat. Similarly, many closely related genera are placed in a bigger group called Family, families are grouped into an order, orders are grouped into a class and classes are grouped into a phylum (plural, phyla) or division (plural; division) in case of plants. The phyla or divisions are grouped into kingdom. All these units are divided into subunits e.g. sub genus, sub phylum and sub kingdom etc. The smallest the group or unit, the organisms found in this group, would be more similar, they have more number of similar character.

Difference between Homologous and Analogous Organisms:

The fruit of all plants, whether sweet, or sour, small and dry or large and fleshy, all are the homologous structures because they develop from ovary of flower. Their origin is common. On the other hand, wings of an insect, and a bird, despite having same function, are not homologous because their origin is different. Similarly green leaf of moss plant and that of any vascular plant are not homologous. These organs are similar in function but different in basic structure and origins are called analogous organs.

Biological Classification of Mustard Plant:

Common Name ----- Mustard

Phylum or Division -----Anthophyta

Class ----- Dictyyledonae

Order -----Capparales

Family -----Brassicaceae

Genus ----- Brassica

Species ----- *Brassica Campestris*

Classification of Human Beings:

Common Name -----Human

Kingdom -----Animalia

Phylum -----Chordata

Class ----- Mammalia

Order -----Primates

Family ----- Hominidae

Genus ----- Homo

Species ----- Homo sapiens

Scientific Name ----- Homo sapiens

Kingdoms of Organisms:

The classification is not static, nor has only one system of classification been followed rather it is dynamic. Whenever any new knowledge is available about organisms, it is used in classification. Therefore, many systems of classification have been used. Living organisms are classified into two to five kingdoms.

Two Kingdom Systems:

All organisms were classified into two kingdoms before present time.

1. Plant Kingdom (Plantae) - It includes all the small and large plants.
2. Animal Kingdom (Animals) - It includes all the animals.

Important Characters of Plants and Animals:

Presence of cell wall and ability to prepare their own food were considered the most important characters of plants.

Lack of cell wall and inability to prepare food and characteristic mode of nutrition and especially the ability to locomote were considered the most important characters of animals.

Plant kingdom and animal kingdom were divided into large groups.

Binomial Nomenclature:

The method of giving scientific names to organisms is called nomenclature. Same animal or same plants may be known by different names. It must have one scientific name so that there may be no confusion. To give such names to living organisms, the method was formulated by carolous Linnaeus (1753). This method is called Binomial Nomenclature. Because this system is simple and comprehensive, so it is accepted and used in whole world.

Rules of Binomial Nomenclature:

1. According to this method, every species of living organisms is given a Latinized scientific name consisting of two parts.
2. The first part is the name of genus and is called generic name. It starts with a capital letter.
3. The second part is the name of species and is called specific name. It starts with a small letter.
4. Both parts of scientific name of a species are either underlined separately or italicized.

The scientific name of mustard plant is *Brassica campestris*. The scientific name of rose plant is *Rose indica*. Similarly the scientific name of frog is *Rana tigrina* and that of human is *Homo sapiens*.

Significance of Binomial Nomenclature:

Before establishment of binomial nomenclature, the names of organisms consisted of many words. These words were based on the characters of these plants or animals. In different countries, even in different parts of same country; local names were used for plants and animals. The same organism may be given different names e.g. turnip, shaljam, gongloo, thi par, and gogroon are all names of same plant. In England, there are at least fifty names for pansy. Similarly a single common name may be used for different kind of organisms e.g. the word "raspberry" is used for about 100 kinds of plants. This confusion can be avoided by giving each organism a scientific name according to binomial nomenclature proposed by Carolous Linnaeus in 1753. It is adopted by all taxonomists.

Biological Classification of Man:

Common Name ----- Man
Kingdom ----- Animalia
Phylum ----- Chordata
Class ----- Mammalia
Order ----- Primates
Family ----- Hominidae
Genus ----- Homo
Species ----- Homo sapiens

Biological Classification of Frog:

Common Name ----- Frog
Kingdom ----- Animalia
Phylum ----- Chordata
Class ----- Amphibia
Order ----- Salientia (Anura)
Family ----- Ranidae
Species ----- Rana tigrina